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(54) **Laundry detergent composition**

(57) A homogeneous laundry detergent composition comprising an organic detergent, a fabric softener

and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane.

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## Description

[0001] The present invention relates to a laundry detergent composition and, particularly but not exclusively, to a laundry detergent composition having detergency properties in combination with fabric-core benefits.

[0002] In recent years modern washing machines have been manufactured to work on an automatic basis whereby an operator inserts a load of laundry to be washed in the machine and then adds the detergent followed by the selection of a preprogrammed automated wash cycle, said wash cycle selection depending on the material as well as the colour of the laundry. Typically, such washing machines are provided with a main compartment in the form of a drum which holds the laundry together with a separate detergent compartment. Once the operator initiates the automated wash cycle the washing machine pumps water into the detergent compartment which causes the detergent and water to mix and flow into the drum which will eventually rotate under the power of an electric motor in accordance with the particular automated wash cycle selected, thus, forcing the water through the laundry. Thereafter the drum will automatically drain of liquid in a spin cycle. The drum is then filled with clean water and a rinse cycle begins in order to remove any remaining detergent from the laundry, again followed by a spin cycle. Once all of the water has been removed and the laundry has been spun, the laundry may be removed from the drum of the washing machine.

[0003] Commonly, however, it is desirable to use a fabric softener in combination with a detergent. The fabric softener is typically based on a cationic surfactant, such as an amino compound (i.e. a quaternary ammonium salt), and is applied to the laundry by adding said fabric softener to a separate sub-compartment within the detergent compartment. After the first spin cycle, as mentioned above, water is pumped into the sub-compartment causing the fabric softener and water mixture to flow into the drum for the rinse cycle.

[0004] As a consequence of certain consumer driven initiatives, particularly the desire of the consumer for a reduction in cost of laundry detergents as well as an increase in convenience, the two-in-one laundry detergent comprising a detergent and fabric softener was created.

[0005] The two-in-one laundry detergent requires careful blending of the various components thereof, particularly when a liquid detergent is to be produced, in order to preserve the homogeneity of the detergent and, thus, ensuring that each quantity of detergent provides a uniform dosage of detergent and fabric softener.

[0006] The two-in-one laundry detergent suffers from several drawbacks, however, one being that fabric softeners used in such detergents do not always provide satisfactory fabric softening properties. Secondly, the two-in-one laundry detergent is susceptible to long term stability problems due to the low miscibility of a detergent and fabric softener.

[0007] The present invention has been made from a consideration of the above-mentioned problems.

[0008] According to a first aspect of the present invention therefore there is provided a homogeneous laundry detergent composition comprising an organic detergent, a fabric softener and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane.

[0009] This composition is advantageous as said composition provides a three-in-one laundry detergent which has a satisfactory cleaning performance, exhibits excellent through-the-wash softening properties whilst additionally providing fabric conditioning benefits to the fabric being washed, such benefits including ease-of-ironing properties.

[0010] Furthermore, although the components of the laundry detergent composition are known individually it is surprising that they are capable of being combined such that they can work synergistically as a three-in-one laundry detergent composition along side each other.

[0011] In a preferred embodiment of the invention the fabric conditioning agent selected from an organic silicone or organic siloxane comprises at least one copolymer of polyalkyl siloxane and an organic quaternary ammonium salt or at least one copolymer or polyalkyl silicone and an organic quaternary ammonium salt. Preferred fabric conditioning agents include a dimethicone copolyol and/or a copolymer of polyalkyl siloxanes and organic quaternary groups, such as silicone Quaternium 8. Ideally, the fabric conditioning agent comprises dimethicone copolyol amido di-linoleyl ammonium chloride or a derivative thereof.

[0012] The detergent component of the present invention may be selected from any suitable anionic, amphoteric, non-ionic, zwitterionic surfactant or mixtures thereof. Preferred anionic surfactants include alcohol ether sulphates and/or sodium lauryl ethoxy (3EO) sulphate, e.g. Empimim KSN 27 (trade mark of Albright & Wilson). Preferred nonionic surfactants include alcohol ethoxylates, C<sub>13</sub>-C<sub>15</sub> alcohol + 3 moles ethylene oxide, e.g. Synperonic A3 (trade name of I.C.I.), C<sub>13</sub>-C<sub>15</sub> alcohol + 7 moles ethylene oxide, e.g. Synperonic A7 (trade name of I.C.I.). Preferred amphoteric surfactants include coco amido propyl dimethyl betaine (CAB), e.g. Genagen 818X (trade name of Hoechst), oleoamphocarboxyglycinates, e.g. Ampholak X07 (trade name of Akzo Nobel).

[0013] The fabric softener component of the present invention may be selected from any suitable cationic surfactant (s). Preferably the cationic surfactant comprises either alone or in combination surfactants selected from any suitable quaternary ammonium compound; quaternary pyridine based compound; quaternary dialkylester (such as Rewoquat WE 18); organic compounds having a C<sub>12</sub> to C<sub>18</sub> hydrocarbon chain of an amine, an ester, an acid or an amine oxide; or a derivative thereof.

[0014] The laundry detergent composition of the present invention may be provided in a solid particulate form or as

a liquid dispersion. The detergent composition is preferably provided in the form of a liquid dispersion.

**[0015]** Where the detergent composition of the present invention is provided as a liquid dispersion a carrier fluid is provided which may be a polar solvent, preferably water.

**[0016]** Further components which may be utilised in the present invention include detergent builders, sequestrants, chelants, optical brighteners, opacifiers, pH modifiers, enzymes, enzyme stabilisers, antifoams, antiredeposition agents, bleaches, bleach activators, soil release polymers, perfumes, dye transfer protection means, antioxidants, colourants and zeolite dispersants.

**[0017]** Preferred sequestrants are phosphonates and/or amino-tri(methylene phosphonic acid), e.g. Dequest 2000 (trade mark of Solutia), preferred optical brighteners include stilbene derivatives, e.g. Leucophor MTD (Clariant Ltd).

**[0018]** Preferred opacifiers include aqueous styrene/acrylic polymer dispersions e.g. Opacifiers 621 (trade name of Morton International Ltd).

**[0018]** The laundry detergent composition of the present invention may comprise any of the following components, preferably in the following range of % weight of the final composition as set out below, namely:

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Component	%wt. Range
Carrier fluid(s)	20-80
Organic detergents(s)	3-50
Fabric softener(s)	1-30

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Component	%wt. Range
Fabric conditioning agent(s)	0.001-8
Further component(s)	0.01-45

**[0019]** Ideally the preferred % weight of the final composition of the various components of the laundry detergent composition are, namely:

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Component	%wt. ( $\pm 5\%$ )
Carrier fluid(s)	71.9
Organic detergent(s)	16.8
Fabric softener(s)	1.3
Fabric conditioning agent(s)	0.003
Further component(s)	10.0

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**[0020]** In the event that it is desired to produce a laundry detergent composition having a biological component, an enzyme, such as SAVINASE 16 LEX, can be incorporated as part of the further component(s) ideally in an amount of 0.1-1.0%wt of the final composition.

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**[0021]** According to a second aspect of the present invention therefore there is provided a method of preparing a homogeneous detergent composition comprising the blending of at least two separate formulations wherein a first formulation comprises an organic detergent and a second formulation comprises a fabric softener and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane and wherein the first formulation represents the major component of the homogeneous detergent composition.

**[0022]** This method is advantageous as it facilitates the production of a laundry detergent composition comprising a detergent, a fabric softener and a fabric conditioning agent which has, surprisingly, excellent stability which allows a uniform dosage of the various components of the detergent to be present in each portion thereof.

**[0023]** In a preferred embodiment of the present invention there are two separate formulations.

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**[0024]** Ideally the first formulation comprises a carrier fluid. The first formulation may additionally comprise any of the further components which may be utilised in the present invention. The first formulation may comprise any and ideally all of the following components, preferably in the range of % weight of the final detergent composition as set out below, namely:-

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Component	%wt. Range
Carrier fluid(s)	10-50
Organic detergent(s)	3-50

(continued)

Component	%wt. Range
Further component(s)	0.01-45

**[0025]** The carrier fluid in the first formulation is preferably water. The detergent of the first formulation ideally comprises from 2-25%wt. alcohol ether sulphate; from 0.5-10%wt. cocoamidoalkyl betaine; and from 0.1-20% alcohol ethoxylate.

**[0026]** The further components of the first formulation may comprise any of the following either alone or in combination: from 0.75-10%wt. sequestrant (preferably amino-tri(methylene phosphonic acid) and derivatives thereof; from 0.5-10%wt. C<sub>10</sub>-C<sub>12</sub> fatty acids; from 0.5-6% sodium hydroxide solution (preferably 32% solution); from 1-15% sodium tripolyphosphate; from 0.5-10%wt. borates; from 1-15%wt. inorganic phosphates; from 0.05-10%wt. optical brighteners (preferably a stilbene derivative or the like); from 1-15% alkyl amphocarboxyglycinates; from 0.01-1% opacifiers (preferably aqueous styrene/acrylic polymer dispersions and the like); if a biological laundry detergent composition is to be produced there may be from 0.1-1.0% of an enzyme. An aqueous Protease is preferred (such as SAVINASE 16 LEX).

**[0027]** In a preferred embodiment of the present invention the first formulation comprises any and preferably each of the following components ideally in the following preferred % weight:-

	Component	%wt. of Final Composition
1.	Water	39.733
2.	Sequestrant	3.333
3.	Sodium hydroxide (32% sol)	3.333
4.	Sodium tripolyphosphate	3.333
5.	Alcohol ether sulphate	9.000
6.	Coco amido alkyl betaine	1.333
7.	Perfume	0.200
8.	Alcohol ethoxylates	2.000
9.	Optical brightener	0.2000
10.	Amphoteric surfactant	4.000
11.	Opacifier	0.067
12.	Others	0.135
	<b>Total</b>	<b>66.667%</b>

**[0028]** Ideally, the second formulation comprises a carrier fluid. The second formulation may comprise any and preferably each of the following components ideally in the following preferred range of % weight of the final detergent composition, namely:-

Component	%wt. Range
Carrier fluid(s)	10-30
Fabric softener(s)	1-30
Fabric conditioning agent(s)	0.001-8

**[0029]** The carrier fluid of the second formulation is preferably water. The fabric softener of the second formulation ideally comprises any of the following either alone or in combination from 0.075-10%wt. quaternary dialkylesters; from 0.075-10%wt. quaternary imidazoline derivatives; from 0.75-10% dialkyl imidazoline methosulphates; and or from 0.75-10% quaternary fatty diamides. The fabric conditioning agent of the present invention preferably comprises from 0.001-4%wt. organic silicone; and or from 0.001-4% organic siloxane. The fabric conditioning agent of the present invention even more preferably comprises from 0.001-4% dimethicone copolyol; and/or comprises from 0.001-4% copolymer of polyalkyl siloxane and organic quaternary ammonium salt.

**[0030]** The second formulation preferably comprises any and preferably each of the following components ideally in the following preferred % weights, namely:-

	Component	%wt. of Final Composition
1.	Water	32.069
2.	Quaternary dialkylester	1.261
3.	Copolymer of polyalkyl dimethicone copolyol amido alkyl ammonium chloride	0.003
	<b>Total</b>	<b>33.333%</b>

[0031] Ideally the components of the first and second formulation are added, in sequential number order as set out above with each addition followed by agitation prior to the addition of the following component. Once all of the components of each of the formulations have been added, each formulation is agitated sufficiently to ensure no agglomerates are present. Thereafter the first formulation is gradually combined with the second formulation, whilst under conditions of agitation in order to ensure that no agglomerates are present in the final laundry detergent composition.

[0032] In order that the present invention can be more readily understood a specific embodiment thereof will now be described by way of example.

#### Example of Liquid Laundry Detergent Composition

[0033] The detergent composition is made, in a first instance, as two separate formulations. Each component of the two formulations is added in sequential number order.

#### First Formulation

[0034]

Component	Mass Kg	%wt. of Final Composition
1. Water	1192.0	39.733
2. DEQUEST 2000	100.0	3.333
3. Sodium hydroxide (32% Sol.)	100.0	3.333
4. Sodium tripolyphosphate	100.0	3.333
5. Empimin KSN 27	270.0	9.000
6. CAB	40.0	1.333
7. Perfume	6.0	0.200
8. SYNPERONIC A7	45.0	1.500
9. SYNPERONIC A3	15.0	0.500
10. LEUCHOPOR MTD	6.0	0.200
11. AMPHOLAC X07	120.0	4.000
12. OPACIFIER 621	2.0	0.067
13. Formalin	2.0	0.068
14. 2.5% WILLIAMS BLUE	2.0	0.067
<b>Total</b>	<b>2000Kg</b>	<b>66,667%</b>

#### Second Formulation

[0035]

Component	Mass Kg	%wt. of Final Composition
1. Water	962.07	32.069
2. REWOQUAT WE 18	37.82	1.261
3. SILICONE QUATERNIUM 8	0.11	0.003
<b>Total</b>	<b>1000.00Kg</b>	<b>33.333%</b>

[0036] Once both the first formulation and the second formulation have been agitated sufficiently (i.e. - no agglomerates are present), the two formulations are combined under conditions of agitation. The resulting detergent composition is homogeneous, has long term stability properties and has a final weight of 3000Kg.

[0037] It is to be noted that the stability of the homogeneous detergent composition is directly related to the ratio in which the respective formulations are mixed. Increased levels of formulation 2 result in "splitting" of the final product. "Splitting" is where the two separate formulations are no longer miscible and separation thereof cannot be prevented.

[0038] It is to be understood that the above described embodiment is by way of example only and that many modifications and variations are possible.

## Claims

1. A homogeneous laundry detergent composition comprising an organic detergent, a fabric softener and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane.
2. A homogeneous laundry detergent composition as claimed in claim 1, characterised in that the said fabric conditioning agent comprises at least one copolymer of polyalkyl siloxane and an organic quaternary ammonium salt or at least one copolymer or polyalkyl silicone and an organic quaternary ammonium salt.
3. A homogeneous laundry detergent composition as claimed in claim 1 or claim 2, characterised in that the said fabric conditioning agent comprises a dimethicone copolyol.
4. A homogeneous laundry detergent composition as claimed in any preceding claim, characterised in that the said fabric conditioning agent comprises dimethicone copolyol amido di-linoleyl ammonium chloride or a derivative thereof.
5. A homogeneous laundry detergent composition as claimed in any preceding claim, characterised in that the said fabric softener comprises a cationic surfactant.
6. A homogenous detergent composition as claimed in any preceding claim, characterised in that the fabric softener is selected from any suitable quaternary ammonium compound, quaternary pyridine based compound; quaternary dialkylester; organic compounds having a C<sub>12</sub> to C<sub>18</sub> hydrocarbon chain of an amine, an ester, an acid or an amine oxide; or a derivative thereof.
7. A homogeneous detergent composition as claimed in any preceding claim, characterised in that the composition comprises said fabric conditioning agent in an amount from 0.001 % to 8% by weight of the total composition.
8. A homogeneous detergent composition as claimed in any preceding claim, characterised in that the composition comprises said fabric softener in an amount from 1 % to 30% by weight of the total composition.
9. A homogeneous detergent composition as claimed in any preceding claim wherein the composition is in the form of a liquid dispersion.
10. A method of preparing a homogenous detergent composition comprising the blending of at least two separate formulations wherein a first formulation comprises an organic detergent and a second formulation comprises a fabric softener and a fabric conditioning agent selected from at least one of an organic silicone or an organic siloxane and wherein the first formulation represents the major component of the homogeneous detergent composition.



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## EUROPEAN SEARCH REPORT

Application Number  
EP 01 30 0711

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
X	WO 92 15745 A (PROCTER & GAMBLE) 17 September 1992 (1992-09-17)	1,5-9	C11D3/37 C11D11/00
A	* example 1 *	10	
X	US 4 978 462 A (SHEPPARD JULIE H) 18 December 1990 (1990-12-18)	1,5-10	
	* example 1 *		
X	WO 97 16516 A (PROCTER & GAMBLE) 9 May 1997 (1997-05-09)	1-5,9	
A	* examples 1,10,11 *	10	
X	WO 98 50502 A (CIBA GEIGY AG (CH)) 12 November 1998 (1998-11-12)	1,5-9	
A	* example 1 *	10	
X	EP 0 396 457 A (COLGATE PALMOLIVE CO) 7 November 1990 (1990-11-07)	1,2,5-9	
A	* page 12, line 3 - line 8; example 1 *	10	
X	US 4 624 794 A (COOKE DAVID J ET AL) 25 November 1986 (1986-11-25)	1,5-9	TECHNICAL FIELDS SEARCHED (Int.Cl.7)
A	* example 1 *	10	C11D
X	WO 97 31998 A (PROCTER & GAMBLE) 4 September 1997 (1997-09-04)	1,5-9	
A	* examples ID,IE *	10	
X	GB 2 210 070 A (COLGATE PALMOLIVE CO) 1 June 1989 (1989-06-01)	1,3,5-8	
A	* claims 1,5; table 1 *	10	
P,X	WO 00 71806 A (UNILEVER PLC ; LEVER HINDUSTAN LTD (IN); UNILEVER NV (NL)) 30 November 2000 (2000-11-30)	1,5-9	
	* examples 1,2 *		
	-/--		
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 9 May 2001	Examiner Saunders, T
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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Office

# EUROPEAN SEARCH REPORT

Application Number

EP 01 30 0711

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	EP 0 459 822 A (UNILEVER PLC ; UNILEVER NV (NL)) 4 December 1991 (1991-12-04) * page 3, line 3 - line 20; claim 1 *	1,2,5-10	
A	WO 92 00303 A (DEWAR ANTHONY G ; GREENE GEORGE H (US); MCCARTHY JAMES P (US)) 9 January 1992 (1992-01-09) * page 16, line 1 - line 28 * * page 20, line 30 - page 21, line 9 *	1,3,4,9	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>9 May 2001</b>	Examiner <b>Saunders, T</b>
<b>CATEGORY OF CITED DOCUMENTS</b> X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

EPO FORM 1503 03 82 (P04C01)



**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 30 0711

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-05-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9215745 A	17-09-1992	AU 1444592 A	06-10-1992
		CN 1064717 A,B	23-09-1992
		CZ 9301846 A	16-03-1994
		DE 69128915 D	19-03-1998
		DE 69128915 T	17-09-1998
		EP 0503221 A	16-09-1992
		ES 2112857 T	16-04-1998
		HU 66690 A	28-12-1994
		IE 920735 A	09-09-1992
		MX 9200990 A	01-09-1992
		NZ 241862 A	24-02-1995
		PT 100210 A	31-05-1993
		SK 95593 A	11-05-1994
		US 5484540 A	16-01-1996
US 4978462 A	18-12-1990	CA 1322632 A	05-10-1993
		DE 3932276 A	29-03-1990
		FR 2636985 A	30-03-1990
		GB 2225787 A,B	13-06-1990
WO 9716516 A	09-05-1997	AU 7521996 A	22-05-1997
		BR 9611374 A	23-02-1999
		CA 2242405 A	09-05-1997
		CZ 9801351 A	11-11-1998
		EP 0858499 A	19-08-1998
		PL 326868 A	26-10-1998
		SK 57798 A	02-12-1998
		US 6022845 A	08-02-2000
WO 9850502 A	12-11-1998	AU 7645898 A	27-11-1998
		BR 9809427 A	13-06-2000
		CN 1254364 T	24-05-2000
		EP 0980417 A	23-02-2000
		NO 995241 A	27-10-1999
		PL 336483 A	19-06-2000
		SK 150299 A	16-05-2000
EP 0396457 A	07-11-1990	AU 628166 B	10-09-1992
		AU 5450690 A	08-11-1990
		CA 2015849 A	02-11-1990
		US 5545342 A	13-08-1996
US 4624794 A	25-11-1986	AU 573839 B	23-06-1988
		AU 4321485 A	05-12-1985
		CA 1232107 A	02-02-1988
		DE 3519601 A	05-12-1985

EPO FORM P4439

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 30 0711

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-05-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 4624794 A		FR 2565265 A	06-12-1985
		GB 2159547 A, B	04-12-1985
		JP 1516736 C	07-09-1989
		JP 61201080 A	05-09-1986
		JP 64000509 B	06-01-1989
		ZA 8503571 A	24-12-1985
WO 9731998 A	04-09-1997	US 5723426 A	03-03-1998
		BR 9707804 A	27-07-1999
		EP 0885283 A	23-12-1998
		JP 3090955 B	25-09-2000
		JP 11504979 T	11-05-1999
GB 2210070 A	01-06-1989	US 4818421 A	04-04-1989
		AT 229188 A	15-05-1994
		AU 2229588 A	13-04-1989
		BE 1002291 A	20-11-1990
		CH 678535 A	30-09-1991
		DE 3832017 A	27-04-1989
		DK 514588 A	18-03-1989
		FR 2637609 A	13-04-1990
		FR 2637609 B	22-11-1991
		GB 2245908 A, B	15-01-1992
		GR 88100611 A, B	22-06-1989
		IT 1224523 B	04-10-1990
		NL 8802301 A	17-04-1989
		SE 8803236 A	22-03-1989
WO 0071806 A	30-11-2000	AU 4919600 A	12-12-2000
		AU 5212400 A	12-12-2000
		WO 0071807 A	30-11-2000
EP 0459822 A	04-12-1991	US 5064544 A	12-11-1991
		US 5174911 A	29-12-1992
		AU 641014 B	09-09-1993
		AU 7737691 A	05-12-1991
		BR 9102246 A	14-01-1992
		CA 2043503 A, C	02-12-1991
		DE 69116737 D	14-03-1996
		DE 69116737 T	05-06-1996
		ES 2084105 T	01-05-1996
		JP 2095451 C	02-10-1996
		JP 4257371 A	11-09-1992
		JP 7122216 B	25-12-1995
		KR 9507824 B	20-07-1995
		ZA 9104153 A	27-01-1993

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 01 30 0711

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.  
The members are as contained in the European Patent Office EDP file on  
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

09-05-2001

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9200303      A	09-01-1992	US      5164522 A	17-11-1992
		AU      8285191 A	23-01-1992
		EP      0539447 A	05-05-1993
		MX      9100031 A	03-02-1992
		US      5474835 A	12-12-1995
		US      5616758 A	01-04-1997
		US      5352817 A	04-10-1994
-----			

EPO FORM P0459

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